Original Article

A Prospective Analysis of Magentic Resonance Imaging and Computed Tomography in Staging with Uterine Cervix Carcinoma: A Single Centre Experience

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ABSTRACT

Background and Aim: Uterine cervical cancer is the most common cancer in Indian women. The purpose of study was to compare the magnetic resonance imaging and CT evaluation in staging with uterine cervix cancer.

Materials and Methods: This study was prospective, correlative analysis study, included 25 patients with diagnosed as uterine cervical cancer. This study was conducted at Department of Radiology and Radio-oncology, CAIMS, Karimnagar. MRI and CT imaging was performed before any operative procedure. All patients underwent radical hysterectomy or abdominal hysterectomy and had detailed histopathological evaluation.

Results: Both MRI and CT image findings are gold standards methods. The Magnetic resonance imaging was superior to CT in tumor detection. Overall distribution shows that in all the clinical staging in MRI giving maximum positive results particularly in stage IVA and IVB in age group 40 to 50 years and 51 to 60 years than the computed tomography.

Conclusion: The present study concluded that MRI is superior to CT in the staging with uterine cervical cancer.

Key words: MRI, CT, uterine cervical cancer, staging

INTRODUCTION

Uterine cervical cancer is the fourth most common malignancy of women in the world and it holds a fourth place of death caused by cancer in women. [1] The staging of the tumour can be evaluated using ultrasound (US), magnetic resonance (MR), computer tomography (CT), positron emission tomography (PET) and bone scintigraphy. [2]

MRI is the method of choice in the evaluation of cervical cancer because it shows better results when determining the local extent of the tumour compared with physical examination and other imaging techniques.[2,3] According to International Federation of Gynecology and Obstetrics (FIGO), Clinical staging has been shown to result in under staging of up to 20-30% in stage IB, up to 23% in stage IIB and almost 40% in stage IIIB, as well as over staging of approximately 64% in stage IIIB. [4,5]

In this study, our aim was to comparing MRI and CT imaging in evaluation in uterine cervical cancer.

MATERIALS AND METHODS

Study population

This study was prospective study, total sample size 25 female patients untreated pathologically proven uterine

cervical cancer were included in the study.

Study Centre and Duration

This study was conducted at Department of Radio-Diagnosis and Radiation Oncology, Chalmeda AnandRao Institute of Medical Sciences, Karimnagar during the period of June 2016 to June 2017.

The patients were 40 to 60 years of age and their average age was 45 years. All patients were subjected to routine clinical staging workup and underwent MRI and CT for preoperative staging.

Inclusion Criteria

- Diagnosed with uterine cervical cancer patients
- MRI and CT
- Aged 40-60 years

Exclusion Criteria

- Mentally illness patients, cardiac diseases were excluded in this study.

Technique of MRI

All MR imaging was performed on 1.5- T magnet system (GE Signa HDxt). Patients were scanned in the supine position, using a pelvic array coil for the pelvic scan. Scans were obtained using the following parameters for the pelvic region: Axial T2-weighted fast spin-echo sequence.

CT Technique

CT Images of the pelvis will be obtained on a G.E high speed Matrix size of 512 x 512 and slice section of 4mm.

Ethical Approval

This study was reviewed and approved by the Institute ethics committee (IEC), Chalmeda AnandRao Institute of Medical Sciences, Karimanagar.

STATISTICAL ANALYSIS

All data entry and analysis were done with using SPASS software for windows 17.

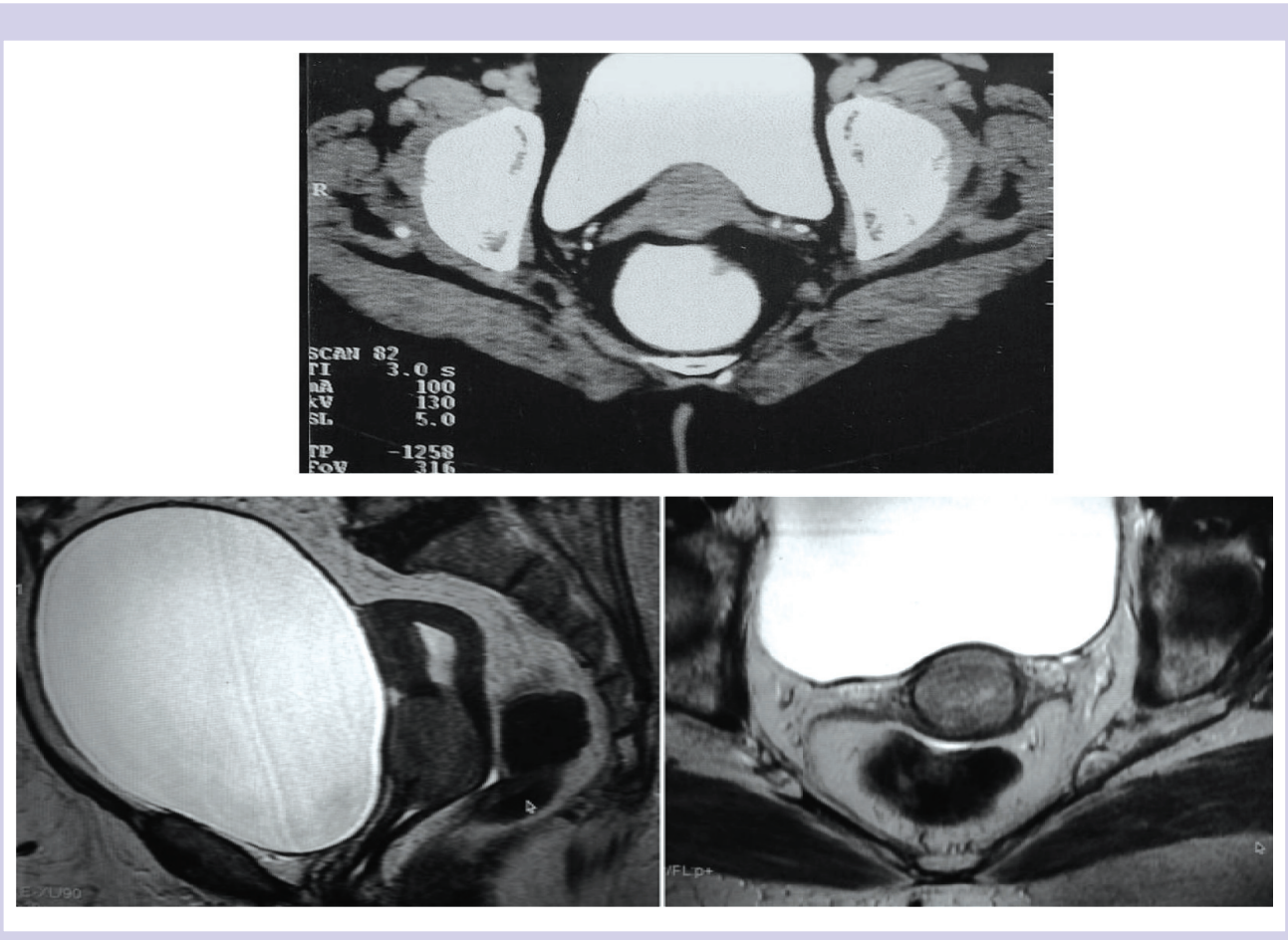


Figure 1: Carcinoma cervix - MRI and CT showing carcinoma localized to cervix (Stage IB)

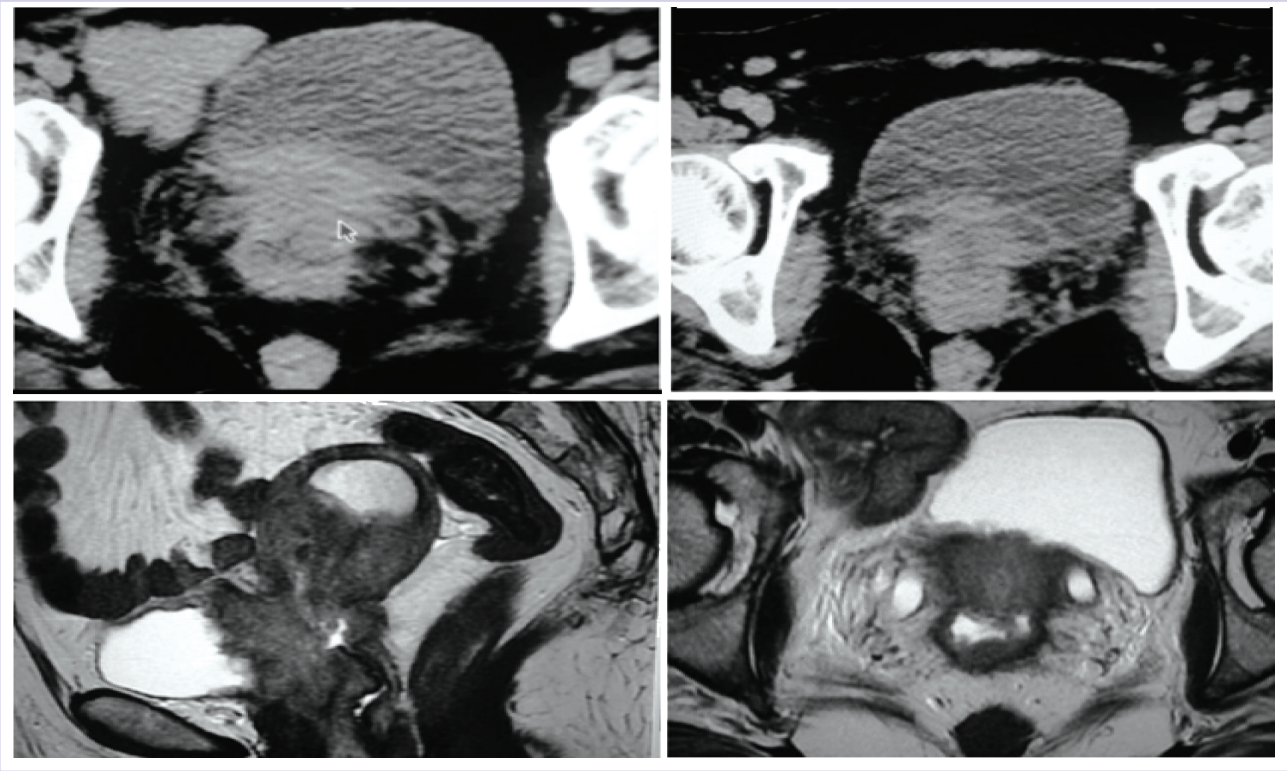


Figure 2: Cervix-CT and MRI showing carcinoma infiltrating bladder, vagina and uterus (stage IVA).

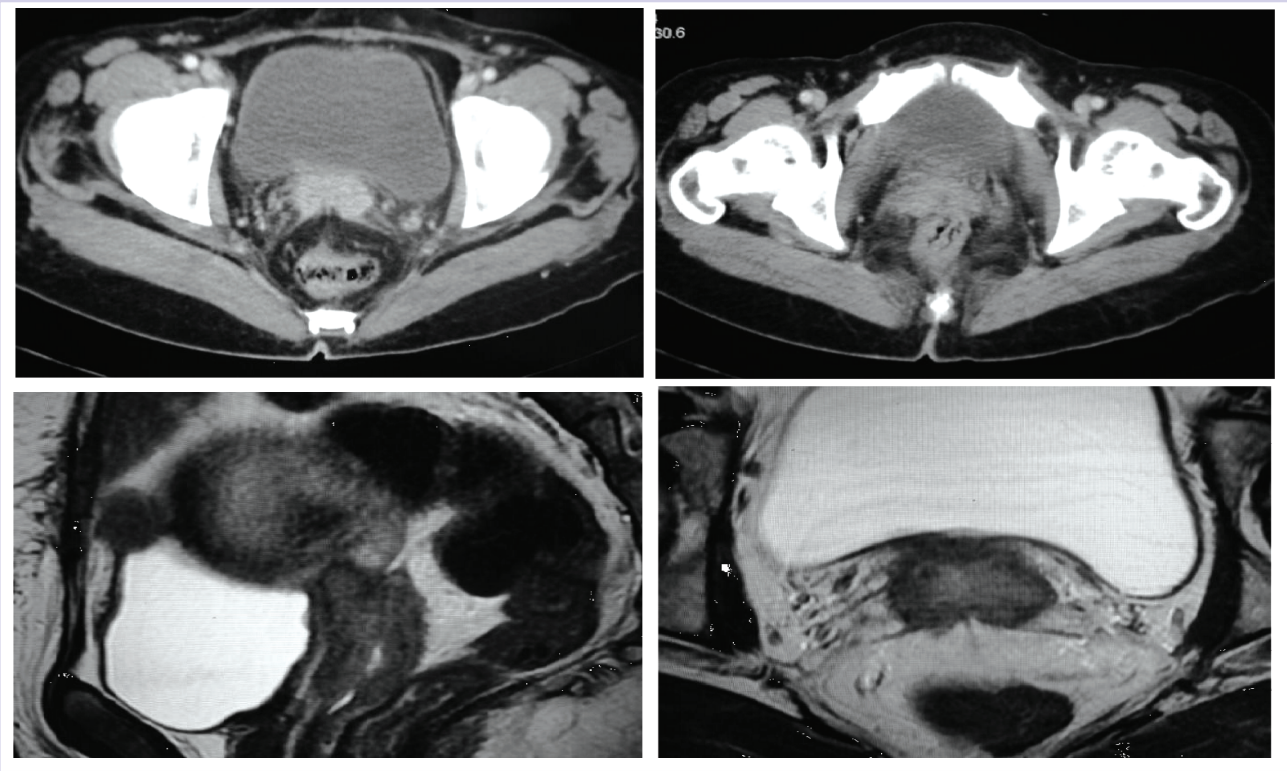


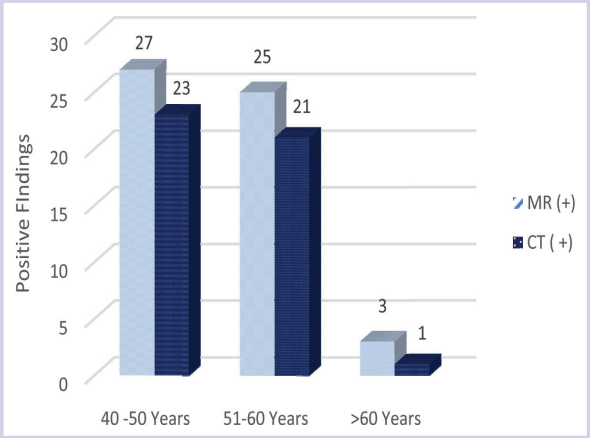
Figure 3: Carcinoma of Cervix-CT and MRI showing Post operative recurrence

RESULTS

A total of 25 female patients with uterine cervical cancer (aged range 40-60 years, mean age=45 years) included in the analysis. (Table 1)

Table 1: Distribution of Positive results of MR and CT according to Age

Age	MR (+)	
40 -50 Years	27	23
51-60 Years	25	21
>60 Years	3	1
Total	55	45

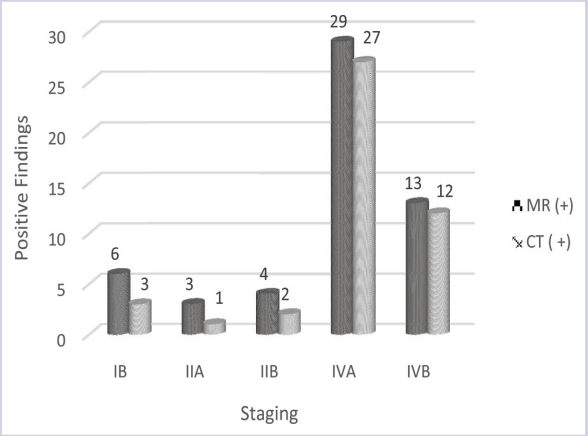


Graph 1: Distribution of Positive results of MR and CT according to Age

Table 2 and Graph 2- Overall distribution shows that in all the clinical findings Magnetic Resonance Imaging giving maximum positive results particularly in stage IVA and IV B in age group 40 to 50 Years and 51 to 6o years than the Computed Tomography.

Table 2: Distribution of Positive results of MR and CT according to Staging

Staging	MR (+)	CT(+)
IB	6	3
IIA	3	1
IIB	4	2
III	-	-
IVA	29	27
IVB	13	12
Total	55	45



Graph 2: Distribution of Positive results of MR and CT according to Staging

DISCUSSION

MRI has the widest application in cervical carcinoma, out of all the gynaecological malignancies. It plays an important role in staging, surgical and radiotherapy planning, monitoring treatment and detecting recurrence. [6]

International Federation of Gynecology and Obstetrics (FIGO) staging is often inaccurate, and as compared to surgical staging, is subject to errors. Clinical staging shows errors of 20-25% depending on the stage of the disease.

Metastasis to local, regional, pelvic or paraaortic lymph nodes cannot be assessed by clinical examination and also the volume and extension of the tumor, extension to the bladder or adjacent bowel is difficult to define clinically, which are critically important for treatment planning. [7]

Uterine cervical carcinoma was diagnosed histopathogically in 25 patients. The other 5 patients were previously diagnosed cases of carcinoma, out of which 4 had undergone hysterectomy and two had radiation therapy. They were referred with a suspicion of recurrence.

CT staging and MR staging were based on previously reported criteria. At CT and MR, a tumor was considered stage IB when a tumor was not seen or was confined to the cervical stroma. At CT, a tumor was considered stage IIA when the upper portion of the vagina showed wall thickening or eccentric mass formation.

At MR imaging when loss of the low signal intensity of the normal vaginal wall was seen, especially on T2 weighted sagittal images, the tumor was considered stage IIA.

At MR imaging, tumor was considered stage IVA when there was loss of the low signal intensity of the normal

bladder or rectal wall, especially on T2 weighted sagittal images. At both CT and MR imaging, pelvic lymph nodes were considered to be abnormal if they were greater than 1.0cm in diameter.

The present study showed that uterine involvement was seen in nine patients in MRI and six cases in CT, out of which three cases showed intact cervical stroma on MR and five patients showed parametrial involvement at MR imaging, suggesting three false-positive cases detected on CT.

The limitation in our study is we did not have any case of Stage III and also no cases were of Stage IA. In a study conducted by Kim S H et al the overall accuracy in tumor staging was 63% for CT and 83% for MRI as compared to clinical staging. [8]

Overall distribution shows that in all the clinical staging in MRI giving maximum positive results particularly in stage IVA and IVB in age group 40-50 years and 51 to 60 years than the computed tomography.

Our study had a number of limitations. First, this is limited by the relatively small number of patients. Further studies on larger series are needed to evaluate the diagnostic performance of Staging in MRI and CT sequences.

CONCLUSION

The present study concluded that MRI is superior to CT and clinical evaluation for measuring cervical tumor size and uterine extension. Magnetic resonance imaging is a choice for staging the primary cervical tumour, evaluate response to treatment and detect tumour recurrence and potential complications.

CONFLICT OF INTEREST :

The authors declared no conflict of interest.

FUNDING : None

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